What is Claimed is:

[c1]   A method of forming a gray scale image having a plurality of image pixels,

comprising:

        selecting a neighborhood of image pixels;

        determining color coordinates, including at least one of image pixel

        luminance, density and brightness, of the image pixels in the neighborhood;

        determining a minimum vector and maximum vector for the pixels of the

        selected neighborhood of the color coordinate which corresponds to one of

        image pixel luminance, density and brightness;

        determining a vector average of the maximum and minimum vectors;

        determining a vector difference between the maximum and minimum

        vectors; and

        determining a signed single component pixel using the maximum and

        minimum vectors, the determined vector average and the determined vector

        difference; and

        determining a threshold based on the signed single component gray pixel.

[c2]   The method according to claim 1, further comprising:

        determining system noise; and

        testing whether the vector difference is greater than the determined system

        noise and minimum feature contract limits.

[c3]   The method of claim 2, further comprising applying static, single component

thresholding if the vector difference is not greater than system noise.

[c4]   The method of claim 1, wherein the color coordinates are specified in one of CIE

X,Y,Z; L*,a*,b*; Y*,u",v*; U*,V*,W*; S, θ , W*; C,M,Y; C,M,Y,K; Y'Cb'Cr; NTSC Y,I,Q;

H,S,I; H,S,V; CIE R,G,B; and NTSC R_N,G_N,B_N color coordinate systems.

[c5]   A system for forming a gray scale image comprising image pixels, comprising:

        a that selects a neighborhood of image pixels;

        a color coordinate determiner that determines color coordinates, including at

        least one of image pixel luminance, density and brightness of the image

        pixels in the neighborhood;

        a vector analyzer that determines a minimum vector and a maximum vector

for the pixels in the selected neighborhood of the color coordinate which corresponds to one of image pixel luminance, density and brightness;

a vector averager that determines a vector average of the maximum and minimum vectors;

a vector difference determiner that determines a vector difference between the maximum and minimum vectors;

a gray value determiner that determines a signed single component gray pixel using the maximum and minimum vectors, that determines vector average and the determined vector difference; and

a threshold adapter that determines a threshold based on the signed single-component gray pixel.

[c6]   The method according to claim 5, further comprising:

a noise analyzer that determines system noise; and

a comparator that compares the vector difference luminance to the system noise and an estimate of the vector difference magnitude to a minimum feature contrast.

[c7]   The system of claim 5, further comprising a static thresholding unit applied when the comparator that indicates that the vector difference is not greater than the system noise.

[c8]

A method of determining a threshold for thresholding color image values, comprising:

selecting a neighborhood of image pixels;

determining color coordinates, including at least one of image pixel luminance, density and brightness of the image pixels in the neighborhood;

determining a minimum and maximum vectors for the pixels of the selected neighborhood of the color coordinate which corresponds to one of image pixel luminance, density and brightness; and

determining a vector average of the maximum and minimum vectors;

determining a vector difference between the dependent maximum and minimum vectors; and

determining a signed single-component gray pixel using the maximum and

minimum vectors, the determined vector average and the determined vector difference; and

determining a threshold based on the signed single-component gray pixel.

[c9]   A system for determining a threshold for thresholding color image pixels, comprising:

a window usable to select a neighborhood of image pixels;

a color coordinate determiner that determines color coordinates, including at least one of image pixel luminance, density and brightness of the image pixels in the neighborhood;

a vector analyzer that determines the dependent minimum and a maximum vector for the neighborhood pixels of the color coordinate which corresponds to one of image pixel luminance, density and brightness;

a computer that determines a signed single-component gray pixel using the maximum and minimum vectors, the determined vector average and the determined vector difference; and

a threshold adapter to determine the threshold based on the signed single-component gray pixel.